

2022 Annual Dam and Dike Inspection Report

Primary Bottom Ash Dam

Flint Creek Plant

Southwestern Electric Power Company

Gentry, Arkansas

August 2022

Prepared by: American Electric Power Service Corporation

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Columbus, OH 43215



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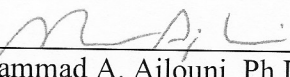
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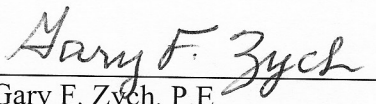
Inspection Date: July 21, 2022

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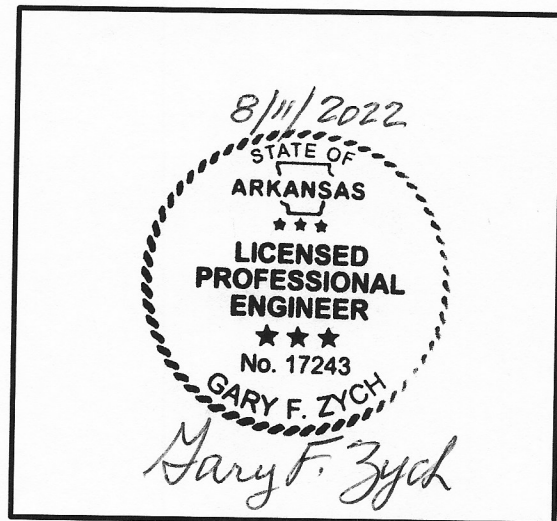
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DATE: 8/11/2022



I certify to the best of my knowledge, information, and belief that the information contained in this report meets the requirements of 40 CFR § 257.83(b).

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1.0 INTRODUCTION

American Electric Power Service Corporation (AEPSC) Civil Engineering administers the Dam Inspection and Maintenance Program (DIMP) at AEP facilities. As part of the DIMP, staff from the geotechnical engineering section conducts dam and dike inspections on a periodic basis. This report was prepared by AEP- Geotechnical Engineering Services (GES) section, in part, to fulfill requirements of 40 CFR 257.83 and to provide the Flint Creek Plant an evaluation of the facility.

The primary bottom ash dam is located south of the Flint Creek Power Plant. Figure 1 (Site Location Map) illustrates the location of the primary bottom ash pond and dam facility. Shah Baig, P.E. of the AEP-Geotechnical Engineering performed the 2022 inspection of the dam. This report is a summary of the inspection and an assessment of the general condition of the facility. Greg Carter, P.E. of the AEP-Plant Engineering coordinated the inspection activities and Scott Carney of the Flint Creek Plant facilitated the inspection of the facility. The inspection was performed on July 21, 2022. Weather conditions were sunny, clear skies, light breeze, visibility was good, and the temperature ranged between 82-92 degrees Fahrenheit. No rain was reported in the last 7 days of the inspection. Inspection findings were briefly discussed with Scott Carney (Plant Environmental Coordinator) and Sarah Vestfals (Plant Manager).

2.0 DESCRIPTION OF IMPOUNDMENTS

Figure 1 provides a general plan view of the facility including the Primary Bottom Ash and Clearwater dams. The Flint Creek power plant is located to the north of the Primary Bottom Ash Pond (PBAP) and the Clearwater Pond (CWP). The coalyard is located east of the power plant and the Flint Creek lake is located west of both dams. The primary bottom ash pond dam is an 820-foot long cross-valley dam on an unnamed tributary to Little Flint Creek. The Primary Bottom Ash Pond is used primarily for the settling and storage of bottom ash, and is considered a coal combustion residuals (CCR) surface impoundment. It also receives runoff from the coalyard, surrounding watershed area consisting of agricultural land, plant site, and residential areas of the City of Gentry, and plant other waste streams. The bottom ash is periodically excavated/dredged for beneficial use. Flow from the reservoir discharges into the Clearwater pond.

Currently, dredging and excavation of CCR are performed at the Primary Bottom Ash Pond for pond closure by removal. The plan is to close the pond by removing all the CCR materials and dispose of at the onsite CCR landfill.

GENERAL INFORMATION

Dam or Reservoir:	Primary Bottom Ash Pond
Owner:	Southwestern Electric Power Company (SWEPCO)
Type of Dam:	Earth-Fill Structure
Date of Construction:	1978
Downstream Hazard:	Low

LOCATION

County:	Benton County
General Location:	Approximately 4.5 miles north of Siloam Springs, AR
Stream and Basin:	Unnamed tributary to Little Flint Creek; Flint Creek Basin

SIZE – PRIMARY DAM

Dam Crest Elevation:	1,155 feet
Dam Height:	45 feet
Water Surface Area:	24 acres (current elevation 1,143.9 feet)
Reservoir Volume:	485 acre-feet (elevation 1,145 feet)

3.0 REVIEW OF AVAILABLE INFORMATION (257.83(b)(1)(i))

A review of available information regarding the status and condition of the primary bottom ash dam has been conducted. This includes files available in the operating record, such as design and construction information, previous periodic structural stability assessments, previous 7-day inspection reports, 30-day data collection reports, and previous annual inspections has been conducted. Based on the review of the data, no signs of actual or potential structural weakness or adverse conditions were noted.

4.0 INSPECTION (257.83(b)(1)(ii))

4.1 CHANGES IN GEOMETRY SINCE LAST INSPECTION (257.83(b)(2)(i))

No modifications have been made to the geometry of the primary bottom ash dam since the last annual inspection.

The plant has made minor changes to the operations of the pond and the water level has been steady. The normal pond level is currently in the range of an elevation 1,143.9 feet. In the past, the normal pond level was at an elevation 1,145 feet.

4.2 INSTRUMENTATION (257.83(b)(2)(ii))

There are four piezometers located along the crest of the dam as shown on Figure 2. These are the only instrumentation related to this facility. A review of readings since the last inspection and historical readings (2017-2022) indicate the levels are consistent and respond to the fluctuation of the cooling lake level. The piezometers are more influenced by the level of the cooling lake than the elevation of the Primary Bottom Ash Pond. A spike was noticed in all the piezometers in May 2022 reading which were consistent with the fluctuation in the lake level. The trend in the historical data between the piezometers reading, lake level, and pond levels are consistent. Table 1 lists the maximum piezometer reading since the last annual inspection.

Figure 3 is a historical plot of the piezometer readings over the past several years.

TABLE 1 - INSTRUMENTATION DATA (primary bottom ash dam)			
Instrument	Type	Maximum Reading (Elevation) Since Last Annual Inspection	Date of Reading
A1	Piezometer	1136.98	5/26/2022
A2	Piezometer	1137.13	5/26/2022
A3	Piezometer	1138.87	5/26/2022
A4	Piezometer	1141.83	5/26/2022

4.3 IMPOUNDMENT CHARACTERISTICS (257.83(b)(2)(iii, iv, v))

Table 2 is a summary of the minimum, maximum, and present depth and elevation of the impounded water and CCR since the previous annual inspection; the storage capacity of the impounding structure at the time of the inspection; and the approximate volume of the impounded water and CCR at the time of the inspection. The data below is based on the original topography and 2004 hydrographic survey. The water level in the Primary Bottom Ash Pond does not vary much during normal operations. Based on the normal operations,

the volume of ash and water remain fairly constant, as material is annually removed or temporarily stockpiled within the footprint of the pond and currently more material has been removed for the pond closure.

<u>Table 2 - IMPOUNDMENT CHARACTERISTICS</u>	
	Primary Bottom Ash Dam
Approximate Minimum depth (elevation) of impounded water since last annual inspection	11.15 ft. (1,143.85 feet msl)
Approximate Maximum depth (elevation) of impounded water since last annual inspection	16.05 ft. (1,146.25 feet msl)
Approximate Present depth of impounded water at the time of the inspection	11.1 ft. (1,143.9 feet msl)
Approximate Minimum depth (elevation) of CCR since last annual inspection	30 ft. (1,150 feet msl)
Approximate Maximum depth (elevation) of CCR since last annual inspection	30 ft. (1,150 feet msl)
Approximate Present depth (elevation) of CCR at the time of the inspection	30 ft. (1,150 feet msl)
Approximate Storage Capacity of impounding structure at the time of the inspection	771 ac-feet (at crest elevation)
Approximate volume of impounded water at the time of the inspection	123.8 ac-ft.
Approximate volume of CCR at the time of the inspection	225 ac-ft.

4.4 DEFINITIONS OF VISUAL OBSERVATIONS AND DEFICIENCIES

This summary of the visual observations uses terms to describe the general appearance or condition of an observed item, activity or structure. The meaning of these terms are as follows:

Good: A condition or activity that is generally better or slightly better than what is minimally expected or anticipated from a design or maintenance point of view.

**Fair/
Satisfactory:** A condition or activity that generally meets what is minimally expected or anticipated from a design or maintenance point of view.

Poor: A condition or activity that is generally below what is minimally expected or anticipated from a design or maintenance point of view.

Minor: A reference to an observed item (e.g., erosion, seepage, vegetation, etc.) where the current condition is below what is normal or desired, but which is not currently causing concern from a structure safety or stability point of view.

Significant: A reference to an observed item (e.g. erosion, seepage, vegetation, etc.) where the current maintenance program has neglected to improve the condition. Usually, conditions that have been identified in the previous inspections, but have not been corrected.

Excessive: A reference to an observed item (e.g. erosion, seepage, vegetation, etc.) where the current condition is above or worse than what is normal or desired, and which may have affected the ability of the observer to properly evaluate the structure or particular area being observed or which may be a concern from a structure safety or stability point of view.

This document also uses the definition of a “deficiency” as referenced in the CCR rule section §257.83(b)(5) Inspection Requirements for CCR Surface Impoundments. This definition has been assembled using the CCR rule preamble as well as guidance from MSHA, “Qualifications for Impoundment Inspection” CI-31, 2004. These guidance documents further elaborate on the definition of deficiency. Items not defined by deficiency are considered maintenance or items to be monitored.

A “deficiency” is some evidence that a problem has developed that could impact the structural integrity of the structure. There are four general categories of deficiencies. These four categories are described below:

1. Uncontrolled Seepage

Uncontrolled seepage is seepage that is not behaving as the design engineer has intended. An example of uncontrolled seepage is seepage that comes through or

around the embankment and is not picked up and safely carried off by a drain. Seepage that is collected by a drain can still be uncontrolled if it is not safely collected and transported. Seepage that is not clear and is turbid would also be considered as uncontrolled. Seepage that is unable to be measured and/or observe it is considered uncontrolled seepage.

Note: Wet or soft areas are not considered as uncontrolled seepage, but can lead to this type of deficiency. These areas should be monitored more frequently.

2. Displacement of the Embankment

Displacement of the embankment is large scale movement of part of the dam. Common signs of displacement are cracks, scraps, bulges, depressions, sinkholes and slides.

3. Blockage of Water Control Appurtenances

Blockage of Water Control Appurtenances is the restriction of the flow section at spillways, decant or pipe spillways, or drains.

4. Erosion

Erosion is the gradual movement of surface material by water, wind or ice. Erosion is considered a deficiency when it is more than a minor routine maintenance item.

4.5 VISUAL INSPECTION (257.83(b)(2)(i))

A visual inspection of the primary bottom ash dam was conducted to identify any signs of distress or malfunction of the impoundment and appurtenant structures. Specific items inspected included all structural elements of the dam such as inboard and outboard slopes, crest, and toe; as well as appurtenances.

Overall, the facility is in good condition. The impoundment is functioning as intended with no signs of potential structural weakness or conditions that are disrupting the safe operation of the impoundment. Currently, the bottom ash from the impoundment has been removed as part of the pond closure work. Inspection photograph location map (Figures 4A and 4B) and inspection photos are included.

- (i) Photograph Nos. 1 and 2 illustrates the downstream slope of the primary dam. The downstream slope of the primary dam appeared in satisfactory condition. Most of the slope was protected with riprap cover except for the upper 12-15 feet of the slope is covered with vegetation. There was no observed displacement or movement of the riprap. There was no seepage observed along the face of the slope. Slightly overgrown vegetation was observed at the upper section of the slope and minor vegetation was seen protruding between the riprap. The north groin at the

downstream slope is shown in Photograph No. 3. The groin indicated excessive vegetation growth.

- (ii) Photograph No. 4 and 5 illustrates the north half of the pond where currently bottom ash from the pond is temporarily stockpiled, dewatered, and dried prior to placement at the landfill. It appears that this area is well maintained with these activities in progress.
- (iii) Photograph No. 6 illustrate crest of the dam. The crest surface of the dam is composed of hard-packed earth topped with bottom ash. Crest is also used by vehicular traffic to access the monitoring instrumentation and at present for the pond closure work. The crest is in generally good condition with no evidence of misalignment, settlement, or cracking. Some minor rutting along the crest was noted due to the vehicle traffic.
- (iv) Photograph Nos. 7 and 8 illustrates the condition of the upstream slope. Most of the larger trees and vegetation noticed in the 2021 inspection were cleared from the upstream slope. The upstream slope of the primary dam was observed to be in satisfactory condition. The interface of the upstream slope and ash limits was visible and stable.
- (v) The emergency spillway (Photograph Nos. 9-11) is an incised channel in natural ground with a concrete weir control section, 1 ft. in height, across the channel width. The spillway was in generally good condition at the time of inspection. The spillway appeared to be generally stable. Vegetation control in this natural ground area is good. Hairline cracks were noticed along the concrete spillway and at the buttress to the north of the spillway.
- (vi) Photograph No. 12 illustrates the principal spillway (overflow discharge structure). The principal spillway for the pond is a concrete drop-inlet structure with stop logs used to control the pool elevation. The spillway was in generally fair condition. Flow through the principal spillway was unobstructed (Photograph No. 13).

- (vii) Photograph Nos. 14 and 15 illustrates upstream slope of the north dike. North dike crest also supports the railroad loop of the coal-yard. The west section of the dike is covered with the dredge cell and most of the slope is covered with the bottom ash buttress/access road. The exposed upper section of the slope is covered with excessive vegetation, but the slope is in stable condition.

4.6 CHANGES THAT EFFECT STABILITY OR OPERATION (257.83(b)(2)(vii))

Based on interviews with plant personnel and field observations there were no changes to the primary bottom ash dam since the last annual inspection that would affect the stability of the impounding structure.

5.0 SUMMARY OF FINDINGS

5.1 GENERAL OBSERVATIONS

Based on the visual inspection and review of the instrumentation information available, it is concluded that the primary bottom ash pond dam is generally in good condition at the time of inspection.

There were no signs of distress that would indicate possible instability, excessive settlement, misalignment, sloughing, or cracking of the dam.

At present, the bottom ash removal activities is performed in the Primary Bottom Ash Pond for the permanent closure of the pond to CCR storage. These activities are mainly conducted within the pond limits and has not impacted the dam structure or its appurtenances.

In general, there is minor vegetation on the slopes and groin area. Few hairline cracks were noticed at the concrete spillway.

5.2 MAINTENANCE ITEMS

The following maintenance items were identified during the visual inspection.

- Continue the vegetation control plan of mowing and spraying.
- Continue maintaining the temporary stockpile and dredge cell/rim ditches for the removal activities of bottom ash so that it is contained within the limited area.
- Avoid any encroachment and overtopping of the dam with bottom ash stockpile.

5.3 ITEMS TO MONITOR

None.

5.4 DEFICIENCIES (257.83(b)(2)(vi))

The primary bottom ash dam exhibited no signs of structural weakness or disruptive conditions during the inspection that would require additional investigation or remedial action.

There were no deficiencies noted during this inspection or during any of the periodic 7-day inspections. A deficiency is defined as either 1) uncontrolled seepage, 2) displacement of the embankment, 3) blockage of control features, or 4) erosion, more than minor maintenance. If any of these conditions occur before the next annual inspection contact AEP Geotechnical Engineering immediately.

If you have any questions with regard to this report, please contact Shah Baig (Phone: 614-716-2241, email: sbaig@aep.com) or Gary Zych (Phone: 614-716-2917, email: gfzych@aep.com)

LIST OF FIGURES

- Figure 1 - Site Location Map
- Figure 2 – Piezometer Location Map
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Figure 1 – Site Location Map
Primary Bottom Ash Dam
Flint Creek Plant, Gentry, AR

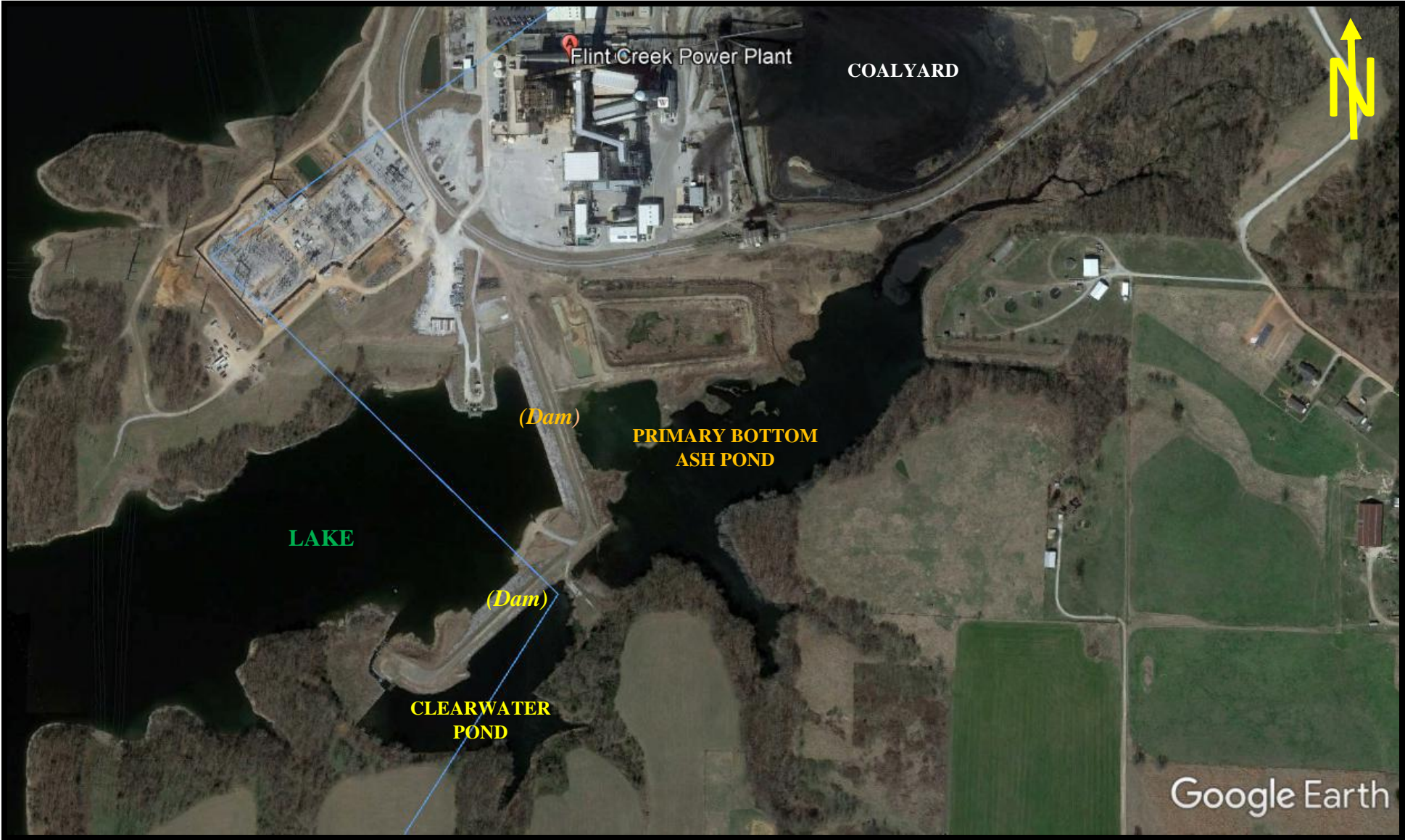
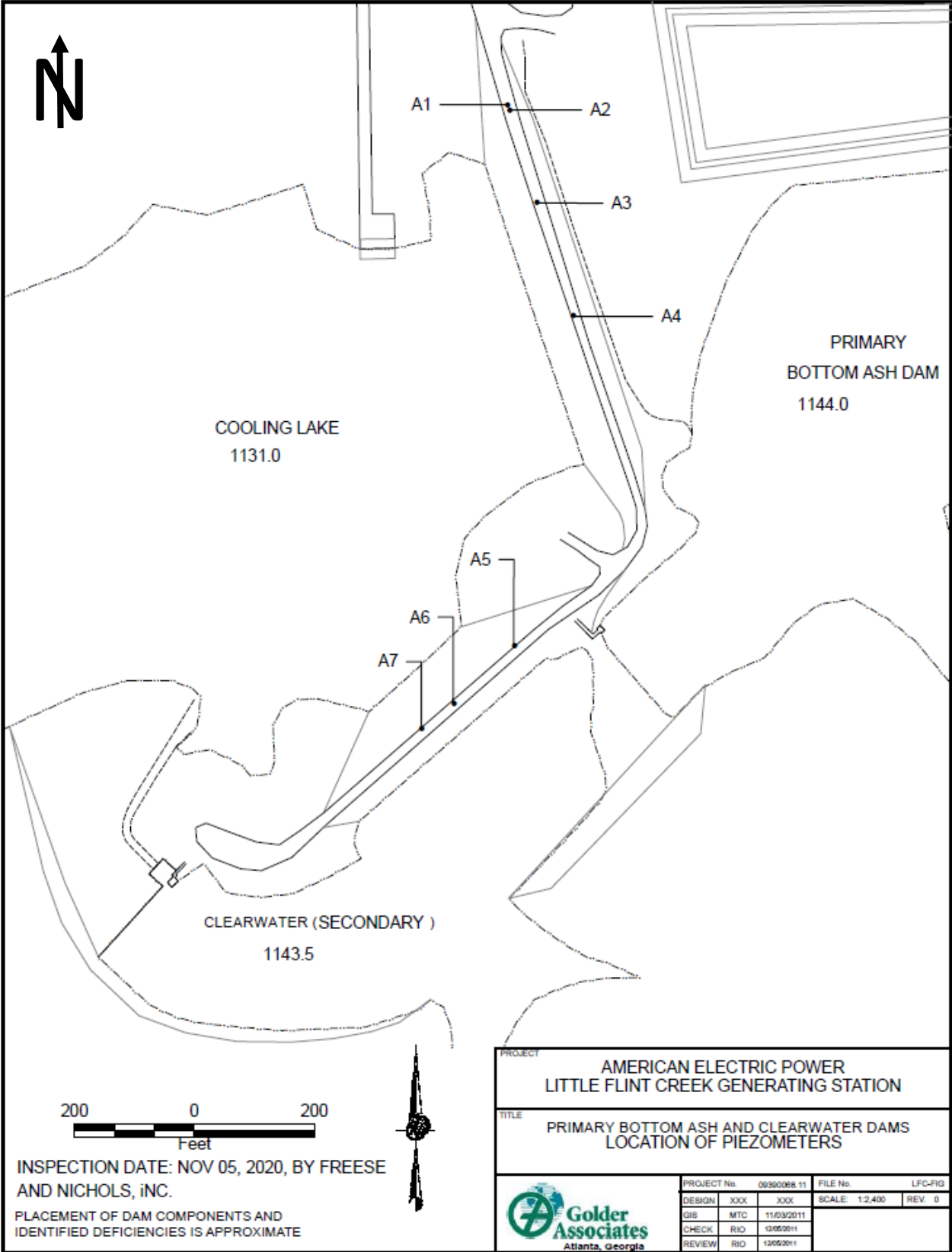


Figure 2 – Piezometer Location Map
Primary Bottom Ash Dam
Flint Creek Plant, Gentry, AR



INSPECTION DATE: NOV 05, 2020, BY FREESE AND NICHOLS, INC.
 PLACEMENT OF DAM COMPONENTS AND IDENTIFIED DEFICIENCIES IS APPROXIMATE



Figure 3 – Historical Piezometer Data Plot
Primary Bottom Ash Dam
Flint Creek Plant, Gentry, AR

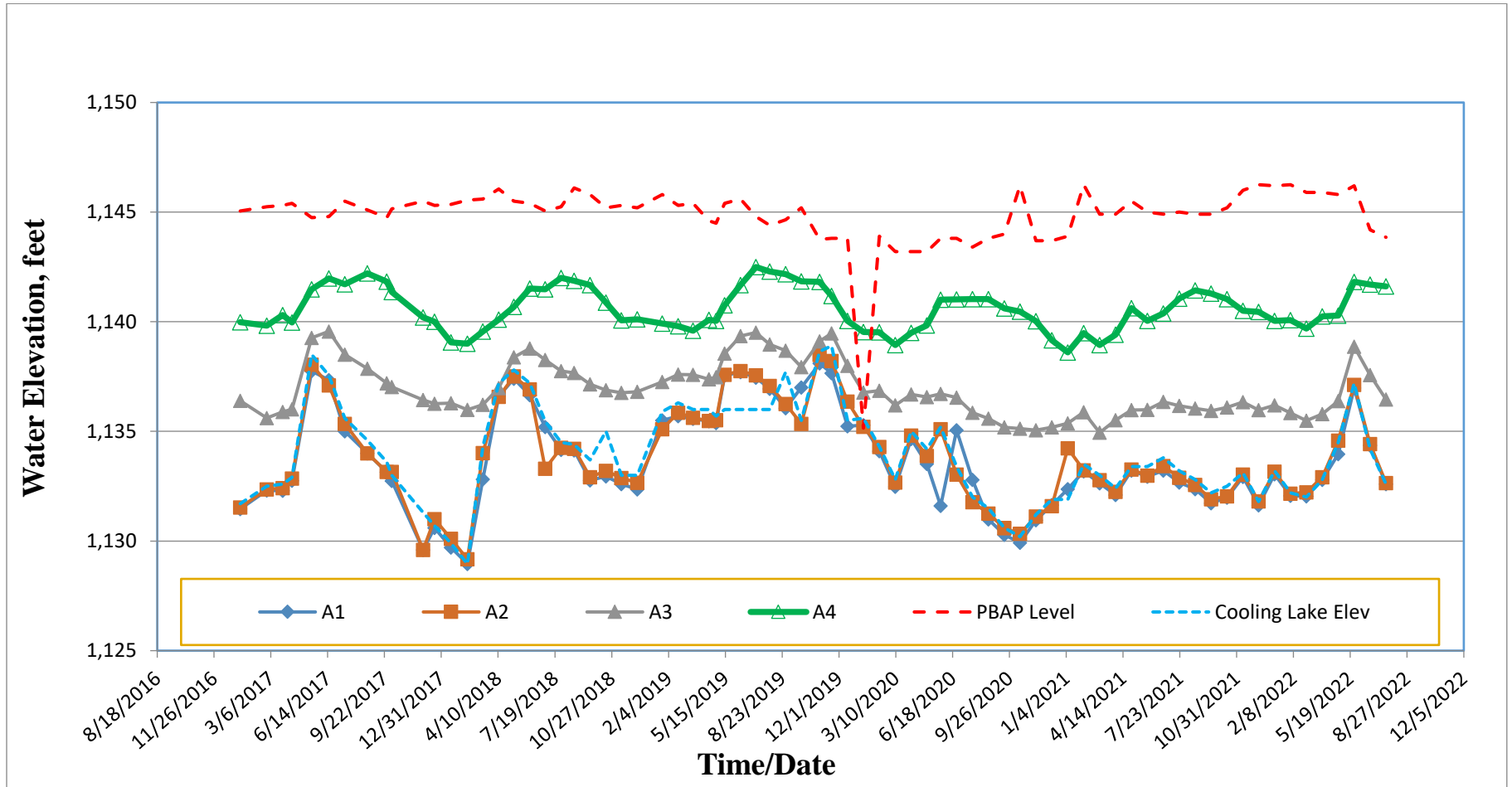


Figure 4A – Photograph Location Map
Primary Bottom Ash Dam
Flint Creek Plant, Gentry, AR



Figure 4B – Photograph Location Map
Primary Bottom Ash Dam
Flint Creek Plant, Gentry, AR



ATTACHMENT

- Inspection Photographs

<p><u>PHOTO #1</u></p> <p>Downstream slope and the groin (looking south).</p>	 A wide-angle photograph showing a rocky and vegetated downstream slope on the left that meets a body of water on the right. The sky is blue with light clouds.
<p><u>PHOTO #2</u></p> <p>Downstream slope (looking north).</p>	 A photograph taken from a gravel path looking north across a grassy area towards a body of water. In the background, an industrial facility with a tall smokestack and various buildings is visible under a clear blue sky.
<p><u>PHOTO #3</u></p> <p>Downstream slope north groin (looking north).</p>	 A photograph showing a grassy slope in the foreground leading up to an industrial facility in the distance. A tall smokestack is prominent among the buildings. The sky is clear and blue.

PHOTO #4

CCR removal activities in the northeast dredge area.



PHOTO #5

Overall view of CCR removal activities.



PHOTO #6

Crest of the dam (looking north).



PHOTO #7

Upstream slope at the south end of the dike (looking north).



PHOTO #8

Upstream slope south end near the overflow discharge structure.



PHOTO #9

Emergency spillway concrete sill (looking north).



PHOTO #10
Emergency spillway
concrete sill (looking
south).



PHOTO #11
Upstream north slope
(looking west).



PHOTO #12
Overflow discharge
structure.



PHOTO #13

Interior of the overflow discharge structure.



PHOTO #14

North dike upstream slope (west section).



PHOTO #15

Another view of the upstream slope (east section).

